

## Infrared Measurement



**N**orplex Oak Inc., LaCrosse Wisconsin, a division of Allied Signal, is a leading manufacturer of laminates for printed circuit boards. A laminate is made up of sheets of "prepreg" placed between copper foil. Prepreg is created by impregnating a continuous glass cloth, or web, with epoxy resin and partially curing it by the application of heat.

To reduce emissions and lower the cost of producing prepreg, Norplex Oak decided to switch to infrared treating towers

for curing instead of the hot air systems in use. This required development of infrared treating towers and

involved extensive research for designing a tower with optimal heat transfer characteristics for prepreg. NASA technology provided an assist.

Norplex Oak engineer Bruce Kline read an article in *NASA Tech Briefs* (see page 141) about a technique developed by Jet Propulsion Laboratory (JPL) for processing data obtained by an infrared radiometer via a straightforward mathematical model into a map of thermal irradiance over a large area.

This technique was developed in the course of JPL's work on simulation of the solar and planetary infrared heat loads on a spacecraft. Kline requested and received from NASA a Technical Support Package that provided full details of the irradiance measuring technique described in *Tech Briefs*.

The NASA information proved very helpful to Norplex Oak, says Bruce Kline. First it enabled confirmation of the company's own computer model prediction of the heat flux pattern. Additionally, it provided information that allowed Norplex Oak to make modifications to its infrared treaters to enhance consistency of the curing process, and it provided a theoretical basis for development of optimal heater placements, allowing the treater tower to produce an even infrared heat transfer to the web.

The new generation of infrared treaters, with the results of computer models incorporated, is now being used in production. The treaters are successfully operating at increased speeds with improved product consistency. **At left**, a technician is operating one of the treaters at Norplex Oak's Riverview Plant in Hoosick Falls, New York. ●

### NASA TECHNOLOGY AIDED DEVELOPMENT OF AN INDUSTRIAL PROCESSING SYSTEM

